



Prevalence of psychological stress and adopted coping strategies among healthcare workers in King Saud medical city (KSMC)

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ABSTRACT

Aim: The present study aims at investigating the level of stress among Saudi healthcare workers during COVID-19 pandemic. In addition, the present study sought to identify the coping strategies adopted by Saudi healthcare workers to alleviate the stress related to COVID-19 pandemic. **Method:** A descriptive cross-sectional study was performed in the period between September and November/2020. A sample of 381 healthcare workers (Physicians, nurses, and technicians) were recruited from King Saud Medical City (KSMC). Both Perceived Stress Scale-4 (PSS-4) and BRIEF-COPE scale were used to assess the levels of stress and the stress coping strategies, respectively. Descriptive statistics were used to analyze the healthcare workers' responses about the COVID-19 related stress and their adopted coping strategies. **Results:** The results of the study showed that there was a moderate to high level of COVID-19 related stress (11.64 ± 0.73) among the Saudi healthcare workers. In addition, it was found that planning (3.89 ± 0.61), positive reframing (3.69 ± 0.77), venting (3.39 ± 1.01), and emotional support (3.27 ± 0.63) were the most adopted coping strategies by the healthcare workers to overcome and reduce the stress levels. **Conclusion:** The study concluded that both problem-focused and emotion-focused stress coping strategies were the most commonly adopted coping strategies among Saudi healthcare workers in KSMC. The study recommends increasing the number of the healthcare workers in the KSMC, in addition to increasing the healthcare workers' knowledge, awareness and practice of the stress coping strategies, especially in crisis events, such as COVID-19 pandemic.

Keywords: Psychological stress, coping strategies, King Saud Medical City, Cross-sectional.



1. INTRODUCTION

Stress is something that's a little bit difficult to define, it likes art, and it's hard to put the boundaries on it (Hubbard et al., 2019). Stress is a stimulus, for example in our everyday language we describe things as stressful or as stressors, situations, people, places, events, time periods, we might look back on a language and say a certain event was stressful or a time period in our life was stressful, or when we are talking to one another about things at work or school and relationships (Rose et al., 2017). We certainly identify that certain things are stressful. So, stress can sometimes be thought of as a stimulus. Meanwhile, stress response can either be psychological; it could include things like emotions, feeling overwhelmed, perhaps depressed or anxious. It may involve behaviors, like avoidance, wanting to pull the cover over our heads and stay in bed on stressful days, or it might involve thoughts, those thoughts that we cannot do this, there is too much going on, or something when a stressful event is over (Bo et al., 2020).

Stress can also involve a physiologic response; things like muscle tension, fatigue in the body, disturbance of sleep or appetite are common physiological responses that we consider part of stress. In general, we think of stress as a strain in our system (Shakya, 2020). It's anything that sort of puts that burden on our psychological and physiological system to respond. Stress is the sum of the psychological and physiological responses and as an overall strain of stress. Stress may be best thought of as a process then, as an interaction between the stimulus and response (Mork et al., 2018).

Definition and sources of stress

Stress could be defined as "the circumstance in which person-environment transactions lead to a perceived discrepancy among the requirements of a situational event and the resources of the person's surrounding environment". This definition indicates that stress places demands on resources and highlights the importance of perceived demands and resources. The World Health Organization (WHO) has defined stress as "the reaction people may have when presented with requirements and pressures, which do not correspond to their knowledge and capabilities and challenging their capacities of coping" (Fink, 2016).

There are a number of sources of stress in today's world, jobs or the academic environment can create lots of stress and there's lots of evidence in the literature for the different sorts of things that cause stress, increased workloads or unrealistic productivity expectations, high responsibility with low power, low control or choice, low support or conflictual relationships, and job insecurity are job stress factors. In addition, stress could come from environmental sources, such as noise, congestion, traffic, opportunity, crime and natural disasters (Harkness & Hayden, 2020). When discussing stress, we need to think about several different dimensions. One important is to think about the duration, so a stressor can either be acute or chronic. A good example of an acute stressor is an upcoming exam or a final exam in a class, that's a stressor that happens within a narrow period of time, and one knows when it ends. On the other hand, a chronic stressor is something that's ongoing, maybe one doesn't know quite when it will end and it doesn't seem to get much better or worse. For example, people who live in war zones would experience chronic stress where just everyday there is danger and stressors, and they are not quite sure when it will end (Somashekar et al., 2020).

Another important dimension is the frequency, is the stressor experience only a single time or a few times or is it a repeated stressor. Again, the exam is a good example, final exams week only happens twice a year and that is going to be an acute stressor you experience only a few occasions versus a repeated stressor (Yoo, 2019). Moreover, the proximity of stress is another dimension, did the stressor happen to you personally or is it vicarious, meaning you observed it. Perhaps it happened to people who are close to you, or people you care about. Some stressors are hassles, little things that are just annoying, traffic on the way to work, difficulty finding a parking place, those kinds of things are hassle stressors, but they are not that intense. At the other end of the scale, are traumatic stressors, these are things that are horrifying or may involve risk to life and limb, these kinds of stressors of course are of a much serious intensity and called traumatic stressors. According to the Diagnostic and Statistical Manual (DSM) for diagnosing psychological disorders, traumatic stressors are defined as those that involve threat to life or limb or integrity of oneself and reactions typically include horror or helplessness, so these are highly intense acute stressors (North et al., 2016).



Stress Coping Strategies

Coping with stress includes categorizing the approaches to coping into at least four broad categories. The first is emotion-focused coping, which is the type of coping that focuses on the emotional and physiological effective stress (Cancio et al., 2018). The purpose of emotional-centered coping is feeling well during stressful situation. A second category is the problem-focused coping, which focuses more on altering the causes or the source of stress. The goal of problem-focused coping is to alter or remove the stressor itself to reduce the stress being caused. Another category is the prevention of stress as a way of approaching stress, by altering the physical environment or building resistance (Chen et al., 2018). Lastly, countering the stress response, which known also as stress management (Cancio et al., 2018).

Going in depth, emotion-focused coping is defined as cognitive or behavioral responses to emotions that result from stress. As mentioned previously, the goal is to feel better in the midst of stress. Emotion-focused can be used in combination with more problem solving or problem-focused approaches. In some situations, emotion-focused coping is the only option (Christman et al., 2017), for example, inescapable or traumatic stress. Avoidance is a common emotion-focused coping strategy that is particularly problematic. Avoidance is what people do when they are in situations that they just don't like, they don't feel good about (Chou et al., 2018). They cause a lot of stress and they try to avoid them. This becomes problematic, especially if it prevents effective behavioral responses. When people use effective emotion-focused coping, there are a number of strategies that can be very helpful. One is to engage positive emotions, people who do this tend to be folks who are more optimistic, and they find the positive in the midst of negative or difficult situations. Finding a sense of gratitude or counting one's blessings, even in the midst of stress or trauma, is another good example of looking for some positive emotions in the midst of some difficulty (Cancio et al., 2018).

Another type of effective emotion-focused coping is finding benefits or meaning. In our common language we talk about looking for the silver linings, every cloud has a silver lining is a popular saying. Sometimes we look for ways that this particular stressor might be helping us learn a lesson or helping us to grow or mature. Sometimes people will lean on a spiritual tradition, or trying to understand how one might be growing in their sense of God or closeness with God in the midst of a stressor or difficult situation, as another example (Jang et al., 2019). One thing that is discussed in the scientific literature is the concept called post-traumatic growth, which is a phenomenon that many people experience, where people often after a difficult stressor, will look back on that and realize that they have learned or grow, or grown in an important way, and they actually see some positive in that experience (Jurišová, 2016).

Another thing people may do is engage in what is called emotional approach. Instead of avoiding the emotions or trying to suppress emotions; actually take time to express those emotions, perhaps to process through some thinking or some worrying. A situation where you feel a need to cry is a good example of emotional approach, of instead of trying to suppress the need to cry or express some emotions, go ahead and take some time to express it, sometimes that's a very positive way of coping (Pérez-San-Gregorio et al., 2018). Lastly, accommodating the stressor is another option. Many people are familiar with what is called Serenity prayer that comes out of alcoholics anonymous and similar communities (Enshassi et al., 2018). They have a prayer that goes God grant me the courage to change the things I can, the wisdom, or excuse me, the patience to accept the things I cannot, and the wisdom to know the difference. That is an example of trying to capture this strategy of accommodating stressors. Sometimes the best things we can do is accepting the reality of the situation and incorporate it into one's new lifestyle, perhaps one's new identity.

Problem-focused coping is coping that seeks to really tackle the stressor head on. Examples for this are a number of different things, including asking for assistance or help, asking for expert help, perhaps learning something new to tackle a different problem is an example, seeking out information or education (Chen et al., 2018). So, for example, if you are starting a new business and the finances are overwhelming you because maybe you are just don't have the experience or the knowledge to know how to manage that part of the business, a good problem solving, problem-focused strategy to cope with that stressor is to go learn more about the finances of the business, try to educate yourself to be able to tackle that part a little more effectively.

Using logic or reason to avoid over exaggerating a stressor, Sometimes one's need to step back, get some perspectives and really think through the stressor and think if perhaps we are making a mountain out of that molehill. Another strategy is to engage in problem solving, and make a plan of action. A one potential process of problem solving process is to evaluate the problem, gathering information, breaking problem into parts, identifying solutions, selecting best solution, taking action, examining results, and testing and reviewing the results (Gustems-Carnicer et al., 2019). Lastly, acting on any steps that can be taken, one could have experienced a stressful situation, perhaps knew what could and should be done, but just didn't take those steps, and that perhaps made the stressor worse or at least did not make it any better. Acting on steps that can be taken is of course the opposite of avoidance that was discussed earlier. Avoidance is problematic, if there are things that can be done, it's probably best to just take those on and move in that direction (Kaur, 2018).

Preventing stress is another category of stress coping strategies. Anything that we can do to remove future stressors is another way of coping with stress. Stress is one of those things where sometimes it's easier to prevent than deal with once it's manifest. So, there are a number of things that could be done about preventing stress (Chen et al., 2018). One is to build social support networks, build relationships and close relationships, connect with individuals, join groups, because when those stressors come along, those are an important buffer in helping to cope with that stress. Exercise and develop of a healthy active lifestyle that includes a healthy diet, those sorts of things are also a good sort of reinforcing the body to endure the physiological effects of a stress response (Xu et al., 2019). Utilizing effective time and financial management were reported to be good things, it is always better to try to avoid having more tasks than there is time, so effective time management, or perhaps to find oneself in a real financial predicament, it's much easier to prevent those than to cope with them once they manifest. Sometimes people need to find different environments,



perhaps in the situations with your housing, your neighborhood, the city in which you live needs to be changed in order to deal with stress finally, preparing for anticipated stressors. Sometimes there are stressors that are out there that we know are coming and we can take steps to prepare. A good example of this is starting school. When one is aware that school is coming, it's wise to start preparing by going and buying supplies, picking up the textbooks, getting everything lined out, so that when that day school starts, you've got pretty much everything else taken care of. If you've ever had that experience where the first day of classes arrive and you are still trying to figure out where you are going to live and buy your textbooks and all this business, that is incredibly more stressful than kind of taking care of business in advance, so that when the stressor begins, you are able to have less on your plate and deal more directly with that stressor alone.

Mental Health Impacts of the COVID-19 Outbreak

Despite focusing on viral transmission and interrupting it, the scientists and experts around the world stressed the necessity to pay attention to the psychosocial dimensions. It is helpful for the people to think about the mental health impacts of the pandemic in two ways (Usher, Durkin & Bhullar, 2020). There is a diffuse stress that we are all feeling, but then there are special groups that have unique stresses being placed on us at this time. Past pandemics and outbreaks of emerging infectious diseases, it was reported that people had a high level of anxiety and stress, and there are a number of reasons for that (Amsalem et al., 2020). This is a health threat that is invisible to the naked eye, if you are sick, you can manifest benign signs that simulate other kinds of disorders, so a person might not be aware of having COVID-19 or the seasonal respiratory diseases. At the same time, one have that uncertainty, also have changes in bodily habits, like handwashing, interruptions to social relationships because of social distancing, and economic interruptions that place stresses. So, there are many reasons why we all have a sense of worry and concern, because this is unfamiliar, it is interrupting routines, and we could get sick, and our loved ones could get sick. So that generates a diffuse sense of distress (Gao et al., 2020).

People who are in self-quarantine face a cascade of impacts. They are cut off from people, and soothing human comfort is not going to be readily available, just because of the social distancing aspect (Guo et al., 2020). Besides, they might be discontinued from their commitments to other individuals that are they can't fulfill their role as a household wage earner, and that will create additional stresses. If these individuals are getting sick, they become more susceptible to stress signs and symptoms. They become uncertain regarding the extent of disease severity. After recovery stage, people might still consider them as a potential source of COVID-19 infection, even if they are not showing any late signs and symptoms and fully recovered. So, they could face stigma (Zhu et al., 2020).

Previous Studies

Too many studies were conducted to investigate the prevalence of psychological stress during the COVID-19 pandemic and the adopted coping strategies by different categories of people. In a study carried out by Islam et al (2020), the purpose was to the Bangladeshi adults' perceptions about COVID-19 stress and factors influencing the quality of life during the COVID-19 pandemic. The study adopted the cross-sectional descriptive approach. A random sample consisted of 340 adults were recruited through distributing an online survey. The results of the study showed that about 85.60% of the study participants are suffering from a COVID-19 related stress, such as sleep disturbances, fear of infection and short temper. In addition, the results showed that financial crisis and lack of food were the most influencing factors that significantly reported to increase the feeling of stress among the study participants.

In China, Fu et al. (2020) conducted a cross-sectional study that aimed at investigating the mental health problems and stress coping strategies adopted by the Chinese residents during the COVID-19 pandemic. The study sample consisted of 1242 residents from Wuhan city, China. The study adopted the Disorder 7-Item Scale (GAD-7), the Patient Health Questionnaire 9-Item Scale (PHQ-9), Athens Insomnia Scale, and Simplified Coping Style Questionnaire as data collection tools. The results of the study showed that anxiety was prevalent among 27.5% of the investigated residents, whereas depression and sleep disturbances were prevalent among 29.3% and 30%, respectively. Moreover, the results of the study indicated that females were more susceptible to anxiety and sleep disorders. In addition, low monthly income was a predictive factor for all investigated mental health problems. Furthermore, passive coping strategy of stress was the most adopted strategy among the Chinese residents in Wuhan city.

Rehmen et al. (2020) investigated the prevalence of anxiety, depression and stress among Indian adults during the COVID-19 lockdown. The researchers performed a cross-sectional study that comprised a study sample of 403 participants who filled a researcher-developed questionnaire about the mental health problems during the COVID-19 lockdown period. The findings of the study showed that the most susceptible category to mental health problems during the COVID-19 lockdown were those who had no



enough supplies. Among the categories, students and healthcare workers were found to be the most affected categories as well. The study indicated that there is a negative correlation between family affluence and the levels of depression, stress and anxiety.

Furthermore, Tan et al. (2020) examined the psychological distress effects of COVID-19 pandemic on Singaporean healthcare workers. The study adopted the cross-sectional research approach through distributing the validated Depression, Anxiety, and Stress Scales (DASS-21) and the Impact of Events Scale-Revised (IES-R) instruments over 470 healthcare workers in two major tertiary hospitals in Singapore. The findings of the research indicated that 14.5% of the subjects had remarkable levels of anxiety, 8.9% were having depression, and 6.6% were detected to suffer from stress. The study revealed that non-medical healthcare workers had higher levels of psychological distress compared to medical personnel.

2. METHODS

Research design

The present study adopted the quantitative approach. A cross-sectional survey was performed in the public hospitals of Riyadh city during the period between September and November/2020.

Participants and setting

The current study was performed at King Saud Medical City (KSMC), which is one of the largest tertiary hospitals in Saudi Arabia. It provides both educational and medical services for Saudi and non-Saudi population. The medical city provides health care services for the population residing either in Riyadh or other surrounding areas. Beneficiaries of these medical services are Saudi citizens and residents who have either governmental or private health insurance.

A total of 381 healthcare workers (physicians, nurses, laboratory technicians) with a response rate of 88.4% out of 431 participants as the calculated sample size, who provided health care services for patients attending the different departments and units of King Saud Medical City between September 2020 and November 2020 were recruited in this study. The participants were assessed in term of meeting the inclusion criteria, and then they were gently asked to fill in the study questionnaire. The inclusion criteria were being a healthcare worker in King Saud Medical City, able to read and write English, had no vacations more than 30 days during the last six months and volunteered to participate in the study. Exclusion criteria included participants who were not involved in providing healthcare services during the COVID-19 pandemic, unable to read and write English language, and not willing to participate in this study.

Data collection tool

This cross-sectional study adopted the questionnaire as a data collection tool. The study questionnaire consisted of three parts. The first part was designed to gather data related to the subjects sociodemographic characteristics, such as position, educational qualification, years of experience, and marital status. The second part of the study questionnaire was Perceived Stress Scale 4 (PSS-4) developed by Cohen (1983) and consisted of four items scaled as Never (0), Almost never (1), sometimes (2), fairly often (3) and often (4). Questions 2 and 3 were reversed. The lowest score is zero and the highest score is sixteen. Higher scores are correlated to more stress among the study participants.

The third part of the study questionnaire was brief COPE inventory developed by Carver (2013). The COPE inventory is consisted of 28 items distributed over 14 coping strategies; Self distraction (items 1 and 19), active coping (items 2 and 7), denial (items 3 and 8), substance use (items 4 and 11), use of emotional support (items 5 and 15), using of instrumental support (items 10 and 23), behavioral disengagement (items 6 and 16), venting (items 9 and 21), positive reframing (items 12 and 17), planning (items 14 and 25), Humor (items 18 and 28), acceptance (items 20 and 24), religion (items 22 and 27), and self-blame (items 13 and 26). Each item is scaled as: I haven't been doing this at all (1), I've been doing this a little bit (2), I've been doing this a medium amount (3), I've been doing this a lot (4).

To ensure the reliability of the study questionnaire, a pilot study was conducted over 30 healthcare workers from King Saud Medical City. Alpha Cronbach's coefficient was adopted in the assessment of the reliability of the study questionnaire. The Alpha Cronbach's coefficient for the PSS-4 scale was 0.81 whereas it was 0.83 for the brief COPE inventory.

Data collection procedure

The study questionnaire was prepared with a cover page that included the title of the study, the researcher's name and contact information. A consent form was enclosed with each questionnaire, which had to be signed by the healthcare worker who agrees to participate in the study. The researcher visited the different departments and units of King Saud Medical City to ensure having the



highest number of participants. The participants were instructed how to fill in the questionnaire and to provide feedback if they encounter any problems when participating in the study or to inform the researcher if they would like to withdraw from the study.

Data analysis

The Statistical Package of Social Sciences (SPSS) (IBM Corporation v.26) was used to analyze the participants' responses. Means and standard deviations were used to analyze the participants' responses to the PSS-4 scale and brief COPE inventory. Moreover, Chi-square analysis was used to investigate the association between the level of participants' psychological stress and their demographic characteristics. A *P* value <0.05 was considered statistically significant.

3. RESULTS

The purpose of this study was to investigate the level of psychological stress among Saudi healthcare workers during COVID-19 pandemic. In addition, it aims to identify any correlation between healthcare workers' psychological stress and the adopted coping strategies during COVID-19 pandemic. This section describes the demographic characteristics and the major findings of the current study.

Baseline characteristics of the study participants

A total of 381 healthcare workers participated in the present study. The mean age of the participants was 35.16 with a standard deviation of 4.118. Females constituted 64.2% (n=353) of the participating healthcare workers was 37.16. Male healthcare workers constituted 58.8% of the total study sample count, whereas females were 41.2%. Distributing the study participants based on their position revealed that nurses were the most represented category (51.7%, n=197), followed by physicians (34.1%, n=130). The least represented category were technicians who constituted only 14.2% (n=54).

The majority of the study participants were married (71.1%, n=271), followed by single participants who were 21% (n=80). In addition, divorced and widowed healthcare workers were 7.1% and 0.8% of the total study sample, respectively. Moreover, categorizing the healthcare workers based on their educational qualification indicated that bachelor degree holders constituted 52.2% (n=199) of the total study sample, followed by those having master degree or higher (46.2%, n=176). The least represented category were those having diploma certificate (1.6%, n=6). Finally, the mean years of experience of the study participants were 10.89 years (table 1).

Table 1 Demographic and Clinical Characteristics of the Study Sample.

| Variable | |
|----------------------------------|-------------------|
| Age (M \pm SD) | 37.16 \pm 4.118 |
| Gender F(%) | |
| Female | 157 (41.2%) |
| Male | 224 (58.8%) |
| Position | |
| Physician | 130 (34.1%) |
| Nurse | 197 (51.7%) |
| Technician | 54 (14.2%) |
| Marital Status | |
| Single | 80 (21%) |
| Married | 271 (71.1%) |
| Divorced | 27 (7.1%) |
| Widowed | 3 (0.8%) |
| Educational qualification | |
| Diploma | 6 (1.6%) |
| Bachelor degree | 199 (52.2%) |
| Master's degree or higher | 176 (46.2%) |
| Years of experience (M \pm SD) | 10.89 \pm 3.986 |



The results shown in table 2 and figure 1 represent the healthcare workers responses to the items of the PSS-4 scale. The results showed that the participants had a moderate to high level of stress during COVID-19 pandemic period (11.64 ± 0.7325). The participants reported high level of confidence about their ability to handle their personal problems (3.01 ± 0.76). However, they reported that difficulties were piling up so high that they could not overcome them (3.14 ± 0.59). In addition, they reported that things were going their way in a low to moderate level (2.86 ± 0.71) and they were unable to control the important things in their lives (2.63 ± 0.87).

Table 2 healthcare workers responses to the items of the PSS-4 scale

| PSS-4 Item | M | SD |
|----------------------------------------------------------------------|-------|--------|
| Unable to control the important things in your life | 2.63 | 0.87 |
| Confident about your ability to handle your personal problems | 3.01 | 0.76 |
| Things were going your way | 2.86 | 0.71 |
| Difficulties were piling up so high that you could not overcome them | 3.14 | 0.59 |
| Total | 11.64 | 0.7325 |

Means and standard deviations for items and total score of PSS-4 scale

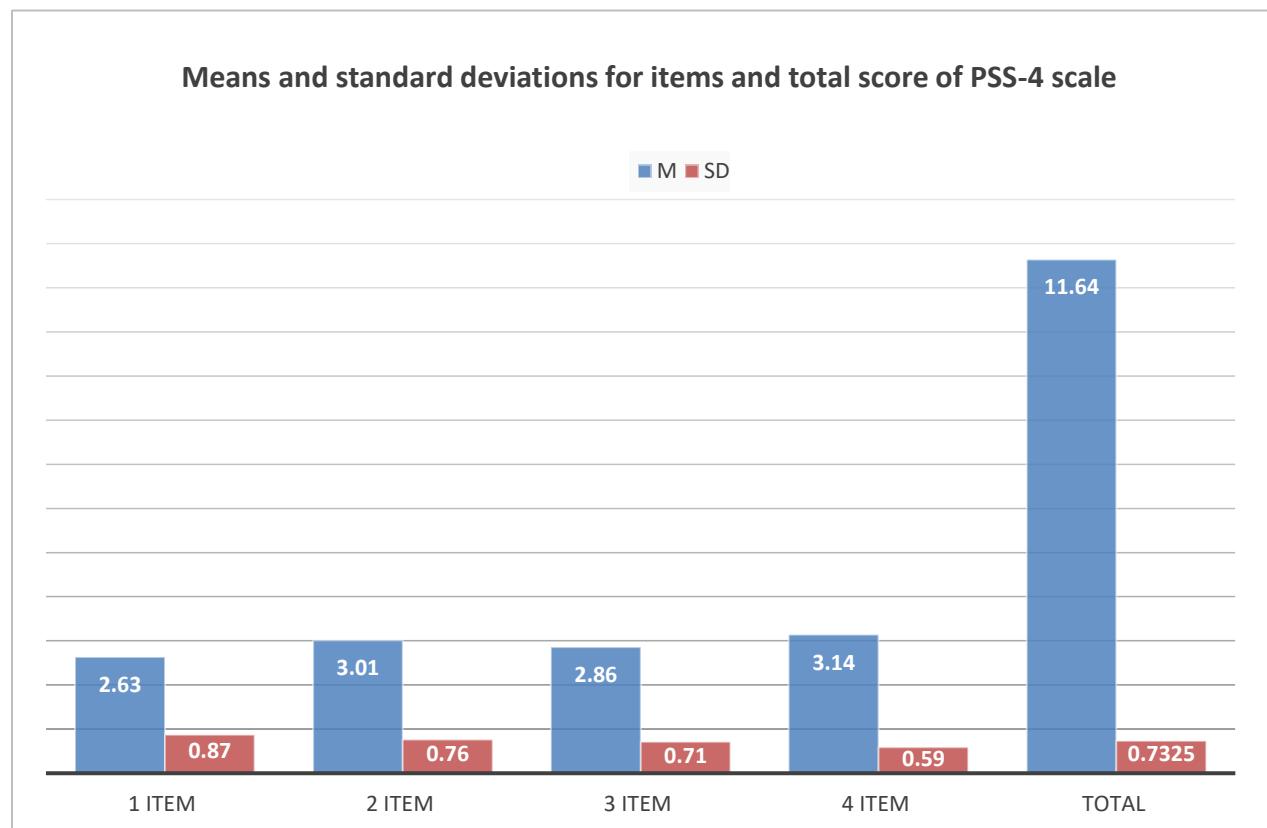


Figure 1 Means and standard deviations for items and total score of PSS-4 scale

The results shown in table 3 represent the mean, standard deviation and ranks of the coping strategies adopted by the healthcare workers to distress during COVID-19 pandemic. The results showed that planning strategy was the most adopted (3.89 ± 0.61), followed by positive reframing (3.69 ± 0.77), Venting (3.39 ± 1.01), emotional support (3.27 ± 0.63), and active coping (3.21 ± 0.46). However, the least adopted coping strategies were acceptance (1.89 ± 0.66), denial (1.36 ± 0.61), self-distraction (1.33 ± 0.75) and substance use (1.01 ± 0.59) (Figure 2).

Table 3 Means, standard deviations and ranks of the coping strategies scale domains

| Coping Strategy | Mean | SD | Rank |
|------------------|------|------|------|
| Self-distraction | 1.33 | 0.75 | 11 |
| Active coping | 3.21 | 0.46 | 5 |

| | | | |
|--------------------------|------|------|----|
| Denial | 1.36 | 0.61 | 10 |
| Substance use | 1.01 | 0.59 | 12 |
| Emotional support | 3.27 | 0.63 | 4 |
| Instrumental support | 2.07 | 0.51 | 7 |
| Behavioral disengagement | 2.68 | 0.81 | 4 |
| Venting | 3.39 | 1.01 | 3 |
| Positive reframing | 3.69 | 0.77 | 2 |
| Planning | 3.89 | 0.61 | 1 |
| Humor | 2.13 | 0.76 | 6 |
| Acceptance | 1.89 | 0.66 | 9 |
| Religion | 2.17 | 0.70 | 5 |
| Self-Blame | 1.91 | 0.73 | 8 |

Means, standard deviations and ranks of the coping strategies scale domains

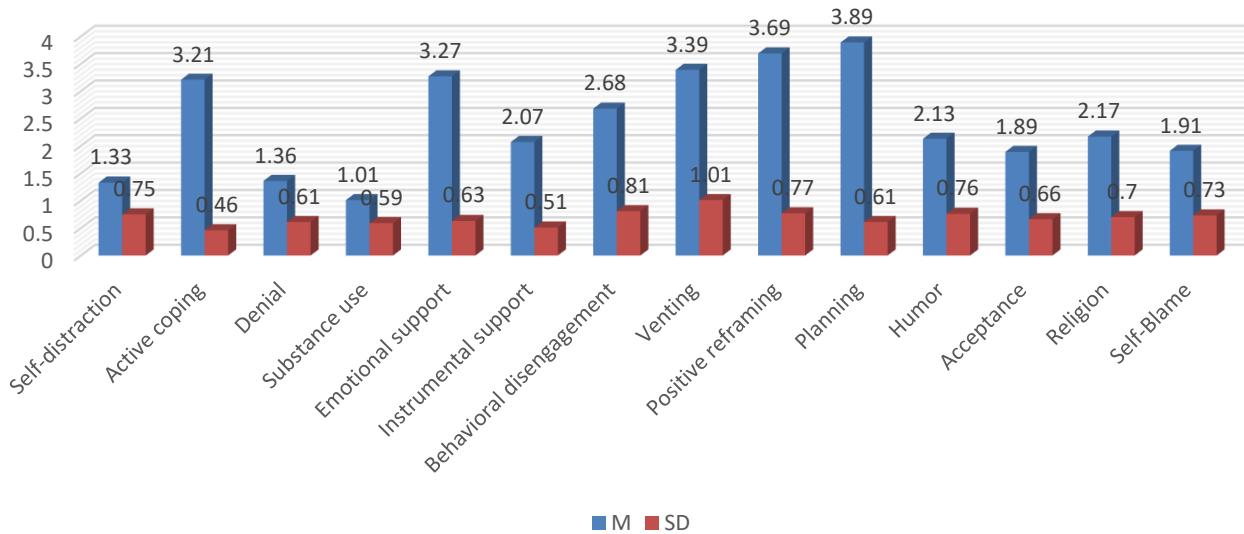


Figure 2 Means, standard deviations and ranks of the coping strategies scale domains

4. DISCUSSION

The present study aimed at investigating the level of stress among healthcare workers during the COVID-19 pandemic period and to identify the coping strategies they adopt to alleviate the stress levels. The demographic analysis of the study participants revealed a medium mean score of the study participants and this could be referred to that the study sample consisted of healthcare workers from different age categories. Male participants were higher in this study sample; this was attributed to the ease of access of the researcher to male healthcare workers during the data collection stage. In addition, nurses were the highest represented category, this was attributed to that nursing staff is the most available category of the healthcare workers in the surveyed healthcare settings. Married healthcare workers were the highest category in the study sample and this could be referred to the mean age of the study participants, in which the individuals are commonly married in the study context, which is the Saudi community. The high prevalence of university degrees (bachelor, master or higher) could be attributed to that this study is performed in a context that requires the staff to have at least a bachelor degree in his/her specialization, with few exceptions in a number of professions, such as technicians. Finally, the mean years of experience might be attributed to the heterogeneity of the study sample, which included old and new healthcare workers and this is referred to the recruitment policies of the surveyed healthcare setting that include the continuous recruitment of the qualified and fresh graduates.

The results related to the stress levels among the healthcare workers revealed that the healthcare workers had a moderate to high levels of stress during the COVID-19 pandemic. Despite that the healthcare workers showed a high level of confidence about their abilities to handle their personal problems, they reported that difficulties were piling up so high so that they could not

overcome them and they were unable to control the important things in their lives. In addition, they reported that things were going in their own way. These moderate to high levels of stress during the COVID-19 pandemic period might be attributed to the high workload and stressful circumstances encountered the healthcare workers during the past 3 months when there was a significant and high increase in COVID-19 cases in Saudi Arabia. The COVID-19 pandemic has added an unprecedented dimension of stress to the working conditions of the healthcare workers in Saudi Arabia. As healthcare workers, many of us are feeling the weight of all of this change, uncertainty and risks. In addition, these levels of stress might be attributed to the emergency situations declared in the Saudi hospitals that receive COVID-19 cases, in addition to the fear of the patients' families that was referred to the lack of knowledge about COVID-19 infection and the fate of the patients, especially at the beginning of the pandemic spread. The psychological stress experienced by the healthcare workers could be considered as a multifactorial issue that included internal and external factors. Internal factors could include the normal working conditions of the healthcare facility, which is a public facility that provide medical services for a relatively large population, in addition to the routine workload represented by the working shifts. With regard to external factors, they might include the healthcare workers thoughts and fear of transmitting the infection to their families and relatives. These factors increased the level of stress experienced by the healthcare workers.

These results are in accordance with the findings reported by Islam et al. (2020) study findings, which reported there was moderate to high levels of stress related to COVID-19 among Bangladeshi healthcare workers. However, these findings are not in line with the findings reported by Tan et al. (2020) who found that there are low levels of stress among healthcare workers in Singapore. Further, the results of the study showed that planning, positive reframing, venting and emotional support were the most adopted coping strategies by the healthcare workers to overcome and reduce the stress levels. The use of planning could be referred to that dealing with new cases, especially COVID-19 cases, is a situation that is mostly considered a crisis management situation, which requires planning as a first step. Planning allow the healthcare worker to determine the further steps and organize the future responses that should be made to eradicate any complications. Even when providing health care for COVID-19 patients, planning are the initial step. Therefore, this strategy could be the best and most suitable choice among the strategies to cope with stress resulting during COVID-19 pandemic period.

In addition, positive reframing was the second most used coping strategy adopted by the healthcare workers to alleviate their stress levels. Positive reframing includes dealing with unhelpful thoughts through recognizing, challenging them and decide if they can replace them with positive thoughts. The use of this strategy might be attributed to the use of critical thinking and logical analysis of the situations by the healthcare workers, especially that the majority of the surveyed healthcare workers are well-educated and they definitely received either educational or training sessions about analyzing the situations and positive reframing issues. Rather than immediately accepting negative thoughts and feeling even worse, healthcare workers might catch it, check it and search for other explanations and change the thought for a more positive one. Another adopted coping strategy is venting, which is an emotion-focused strategy. Venting is allowing the unpleasant feelings to escape. The use of this strategy among the surveyed healthcare workers might be referred to the routine and normal discussions held between healthcare workers, where they express their negative feelings to each other and this could significantly reduce the level of stress. However, this strategy was reported that it could increase the person's negative thoughts.

Moreover, emotional support was reported as one of the most adopted stress coping strategies used by healthcare workers during the COVID-19 pandemic period. Receiving emotional support from others is a positive coping strategy, this is emotion-focused to get the individual in the right direction and this occurs when getting emotional support from others, which results in gaining comfort and understanding from someone. Getting emotional support from other people leads to better deal with the stressful situations.

The results of this study are consistent with the findings reported by Vagni et al. (2020) who reported that emotion-focused and problem-focused strategies were the most commonly adopted stress coping strategies among Italian healthcare workers. The low levels of using other coping strategies such as denial, self-blame and avoidance could be referred to that these strategies are unsuitable in the medical context. Especially when dealing with critical cases, such a COVID-19 cases. Any of these negative strategies might significantly affect the medical condition of the patient and at the same time affect the mental health of the healthcare worker. Finally, it is clear the problem-focused and emotion-focused stress coping strategies were the most common types of coping strategies used by the healthcare workers to alleviate the stress levels during the COVID-19 pandemic period.

5. CONCLUSION

To conclude, the present study revealed that there is a moderate to high levels of stress among Saudi healthcare workers in KSMC during the pandemic period. The problem-focused and emotion-focused coping strategies were the mostly used strategies to overcome the stress experienced by the healthcare workers. The study recommends increasing the number of the healthcare



workers in the KSMC, in addition to increasing the healthcare workers' knowledge, awareness and practice of the stress coping strategies, especially in crisis events, such as COVID-19 pandemic.

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Author contributions

Both authors participated equally in formulating the theoretical framework, reporting literature, conceiving and designing the analysis, collecting data, contributing to data analysis and tools, performing the analysis, writing the paper and reporting the results.

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Conflict of Interest

The authors declare that there are no conflicts of interests.

Informed Consent

Written & Oral informed consent was obtained from all individual participants included in the study. Additional informed consent was obtained from all individual participants for whom identifying information is included in this manuscript.

Ethical Approval

The present study was approved by the Medical Ethics committee of Imam Muhammad Bin Saud Islamic University (Ethical approval code: 002-031-1).

Data and materials availability

All data associated with this study are present in the paper.

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